

How Books are Made

The Story of a
Progressive Industry

as told by
LEON EPSTEIN

with the aid of machines in
operation, photomurals and
work-in-progress exhibits

Foreword by
J. RAYMOND TIFFANY

The New York Times National Book Fair
Rockefeller Center

November 5th to 19th, 1936

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Book Manufacturing *An Important Industry*

THE history of book manufacturing reads like a romance. A study of the progress of the graphic arts from the time of the movable tablets—our first books—is an edification in itself. We sincerely trust that the exhibit which the Book Manufacturers' Institute is privileged to present at this Fair will be instructive as well as interesting to you.

The Book Manufacturers' Institute is the national association for the industry and represents most of the important book manufacturers in the United States.

The principal book manufacturing centers are located in New York, Massachusetts, Illinois, New Jersey, Pennsylvania, Indiana, Virginia, Tennessee.

Complete manufacturing plants are divided into different departments (a) Composing Room, devoted to typesetting by hand and machines; (b) Foundry, where electrotype and similar plates are made; (c) Pressroom, in which the paper is imprinted; and (d) Bindery, wherein the flat or

folded printed sheets are bound. Each division of the work is a specialty in itself and requires the services of skilled men and women.

Not all establishments are "complete plants"; that is, they do not contain all of the activities necessary to the conversion of the manuscript into a completed book. It is not unusual for some publishers to have the composition or plates made by one concern, the printing done by another and the printed sheets sent to a third plant for the binding.

A modern complete establishment requires an investment running into millions of dollars and furnishes employment to hundreds of men and women. The capacity of productivity of such a plant is often as high as 50,000 books daily. In the month of August, 1936, one establishment actually manufactured over 1,700,000 volumes.

Book manufacturing is not confined to typesetting, presswork and putting a book together. Selection of the proper type face, the number of words to the line, lines to the page, the kind of paper to be used as to weight, color, finish, all have to do with making a readable book devoid of eye-strain; the cloth for the covers, the cover design, even the glue, in the matter of warping the covers, are im-

portant considerations. The fact is that every book presents a new and different problem to the careful manufacturer. A book worth making is entitled to be well set up and smartly presented.

We do sincerely trust that our exhibit has inculcated within you a more definite appreciation of the many processes involved in book manufacturing—processes of which you will have only a glimpse at this fair. When you next sit with your books, visualize these great organizations with their complex machines, massive presses and binding equipment integrating through their various steps the numerous items which went to make up your book.

In the following pages we have endeavored to assist you in comprehending “How Books are Made.”

J. RAYMOND TIFFANY, *General Counsel*,
BOOK MANUFACTURERS’ INSTITUTE, INC.

THE MACHINES IN OPERATION

All of them, except the miniature paper-making machine, are used in book manufacturing plants. They are authentic and, in each case, the last word for the particular work to be done.

Of course, they represent only part of the equipment that is necessary to completely turn out a book. Limitations of space and the structural restrictions of the building made it impossible to include the very large and extra-heavy machines that one can see in a modern plant.

Nevertheless, you will miss very little of the picture of book manufacturing; for, in addition to the seven machines to be seen here, there are twenty-two photomurals on the walls that provide a step-by-step record of what actually does happen in real plants from the time that the author's manuscript is received.

THE TWENTY-TWO MURALS

Unlike the usual photographs of machinery, the "shots" taken for this Exhibit avoid the confusing maze of wheels, rods, gears, etc., and direct attention to a vital part of the equipment, where actual manufacturing is done.

PHOTOMURAL 1

MAKING A MATRIX shows an important precision operation, cutting the steel punch. For his guide, the punch cutter has a large brass letter pattern plate. As he follows its outlines with trained eye, the machine transfers the motion of his tracing point to the punch cutting tool above. At least one punch must be cut for each alphabetic character, numeral and punctuation mark, for each point-size of type. From the steel punch are made the small pieces of brass, called mats or matrices, which are used in the Linotype machine. There are fifty-eight individual operations in making each matrix. ELECTRA, the type-face used in "EX LIBRIS" was designed by W. A. Dwiggins.

PHOTOMURAL 2

WRITING THE BOOK gives us a glimpse of the author at work, at his desk, doing his part of the manufacturing job in his own way. In the case under the photomural are several pages of the manuscript of "EX LIBRIS," specially written for the Book Fair, as delivered by CHRISTOPHER MORLEY, also the author's copy of the galley proof with his corrections and okay.

PHOTOMURAL 3

DESIGNING THE BOOK: We show here through the layouts of Richard Ellis, Typographer and Book Printer of The Haddon Craftsmen, how the physical makeup of a book comes into being. The typographer, who is the architect of the book, carefully plans each detail of the format such as the size, type face, type page and margins, decorations, selection of paper and binding, etc., and finally, in the case of special editions, supervises the actual composition, printing and binding.

The designing of the binding, which is to harmonize with the text pages, requires artistic judgment and an appreciation of the book as a whole. Ernst Reichl, who is Designer and Typographer for H. Wolff Book Manufacturing Company, has chosen a cloth for "EX LIBRIS" and created a binding decoration that typifies the book.

PHOTOMURAL 4

LINOTYPING is supplementary in purpose, since there is a Linotype in operation on the floor. Our objective here was an angle that cannot ordinarily be seen at the machine. We therefore decided on an inside view of the casting chamber

where a stick of assembled mats and spaces, forming a line of type, serves as the mould for the casting of a slug of lead. It should be observed, when watching the Linotype at work, that the brass mats and spaces are lifted out of the casting chamber, after each slug is made, and are redistributed for use over and over again.

To check up on possible errors that may have escaped the notice of the author, in his final reading of the manuscript, or that may have been made inadvertently by the Linotype operator, in transcription, a proof is pulled of a column of slugs, about twenty inches long. This is called a galley proof or galley. The duplicate copy of the "EX LIBRIS" galley is in the case. (Sol M. Cantor, President of International Trade Composition Association will lecture and demonstrate evenings.)

PHOTOMURAL 5

ELECTROTYPING depicts the foundation step in an electrolytic process that involves over fifty separate operations. The wax case has just been lifted off the type form, showing the reversed reproduction, with every letter and detail clearly impressed into the wax. In the case under the

photomural, successive steps in the making of an electrotpe finally bring us to the copper shell which is used in printing.

PHOTOMURAL 6

MAKING UP THE FORM pictures the pressman tightening (locking-up) the electrotpe plates in a steel frame (chase). After this, his job is to level the height of the form, at all points, so as to get a uniform distribution of impression over the entire surface. This is called "make-ready" and consumes a good deal of time. In the case under the photomural are a number of IMPOSITION SHEETS. These are the instructions that the pressman must follow, in making up the form, to be sure of consecutive pages after the sheets are folded.

PHOTOMURAL 7

PRINTING THE BOOK calls particular attention to the fact that the printing presses generally used in book work are very much larger than the one in operation on the floor. The printed sheets delivered to the bindery are 44 x 64 inches, most of the time, and on occasions 46 x 68 inches. The MIEHLE HORIZONTAL handles a sheet of 22

x 28 inches. Printed at The New York Times National Book Fair, "EX LIBRIS" requires eight 8-page forms. By comparison, only one 64-page form would be necessary if the printing were done on the large MIEHLE which is reproduced in the photomural.

PHOTOMURAL 8

FOLDING ushers us into the bindery, for the first time, and again gives us a new meaning to a familiar word. Before it was "IMPOSITION". Now it is "SIGNATURE"; and we learn that it refers to a folded sheet of 4, 8, 16, 32 or 64 pages. "EX LIBRIS", as you will observe in the case under the photomural, is made up of eight signatures of eight pages each.

PHOTOMURAL 9

GATHERING reminds one of the fact that a book manufacturing plant takes up a great deal of space. Here is a machine 65 feet long; therefore could not possibly fit into the Exhibit room. The gathering is done by a conveyor belt and a row of forty automatic fingers, one for each signature. An examiner, at the end of the line, checks for

human slip-ups. An air-pressure control guards against mechanical difficulties, stopping the machine immediately whenever anything goes wrong.

PHOTOMURAL 10

SEWING gives a back view of the machine and a close-up of the sewed signatures. It may surprise you to know that, in sewing "EX LIBRIS," more than two yards of thread are needed per copy. In bulky books of a thousand pages or more, the total is in excess of twelve yards. The machine in operation on the floor is so placed that every functional part can be seen without difficulty.

PHOTOMURAL 11

SMASHING introduces us to another important step in the making of a book that can only be seen at a plant. The weight of the machine is seven tons, 330 pounds per square foot; and the Rockefeller Center maximum is only 100 pounds per square foot. The function of the machine is to force out all of the air from the signatures and determine the correct bulk of the book. The pressure is 250 tons per smashing surface, 165 tons per square foot.

PHOTOMURAL 12

TRIMMING: This fascinating piece of equipment weighs eight tons. The particular point of interest is that two books are trimmed simultaneously, the side of one and the head and foot of the second. The knives can be adjusted so that any of the three edges are left uncut while the others are being cut. The motion of the knives is diagonal rather than vertical or horizontal, thus assuring the sharpest kind of a cut.

PHOTOMURAL 13

TINTING AND GLUING needs no explanation. It is noteworthy, however, because of the absence of big machinery. When gilding is substituted for tinting, the method is quite different. Genuine gold leaf is used in an enclosed space from which shifting air currents are eliminated.

PHOTOMURAL 14

ROUNDING AND BACKING typifies the camera-approach that we have kept in mind in all of our reproductions. Here you see exactly where the rounding and backing are done; the two cylinders that turn in opposite directions, towards

each other (one clockwise, the other counter-clockwise), and the rocking shaper that gives definite form to the back of the book. Isn't it easy to see why this machine is not on the Exhibit floor?

PHOTOMURAL 15

LINING-UP indicates how crash and paper are applied to the back, giving it additional strength.

PHOTOMURAL 16

CASE MAKING: Unlike the machine on the floor, in size and construction, the cloth is fed from a roll automatically and cut to shape by sharp knives at two points.

PHOTOMURAL 17

STAMPING THE CASES pictures the type of press that can only be used for metallic foils. On the other hand, the machine operated on the floor, while essentially an ink stamper, is convertible to leaf work by the attachment of a roll-leaf feed.

PHOTOMURAL 18

CASING-IN brings us to the last and, in the opinion of Waldo Walker of *The New York*

Times, one of the most interesting steps in the whole art of automatic book production. It also indicates what is done with the moist books after they are cased-in. We refer to the hydraulic presses, in the background, under which the books, between pressboards, are kept from 12 to 24 hours and subjected to a steady pressure of seven tons per square foot. The purpose, of course, is to force moisture out of the books so that the pages will not wrinkle and the covers will not warp or twist.

PHOTOMURAL 19

DESIGNING THE JACKET attempts to describe how Georg Salter proceeded from a reading of Christopher Morley's manuscript to the final rough outline of his jacket design. In the case under the mural is the finished drawing, also a few words about Salter by Frederic G. Melcher, editor of *The Publishers' Weekly*, *The American Book Trade Journal*, and member of the Directing Board of the Book Fair.

PHOTOMURAL 20

MAKING OFFSET PLATES shows the plate after it has been developed under powerful arc

lights and is ready to be taken out for finishing. The offset process makes possible the reproduction of all kinds of engravings as well as type matter by a method very similar in scope to photography.

PHOTOMURAL 21

PRINTING JACKETS BY OFFSET emphasizes the point at which the sheet is fed into the machine in order to call attention to the essential difference between offset and letterpress printing. Look at Photomural No. 7 again (Printing the Book). Offset printing is suitable for black and white also color work, allowing the use of rough finished paper. Because the impression is taken from the zinc plate by a rubber blanket and then transferred to the paper, a soft effect is assured at all times. Offset is of special interest to publishers in book work when original plates are not available or when the cost of new composition and new plates is prohibitive.

PHOTOMURAL 22

PUTTING JACKETS ON BOOKS serves to convey the idea that, in addition to a great deal of equipment, book manufacturing involves a

considerable amount of handwork and provides employment for many thousands of skilled and unskilled workers. The payroll of the members of *The Book Manufacturers' Institute* is in excess of one million dollars a month.

BE KIND TO BOOKS

PHOTOMURAL 23

It seems fitting, upon concluding the four-wall tour of book manufacturing, to add a word of caution to those who value the books they buy or receive as gifts.

Notwithstanding all that is being done to put strength and endurance into the backs of books, careless handling, especially when the book is being opened for the first time, usually invites quick destruction.

The right way to open a book is the easiest.

Start by placing its back against a smooth surface, holding the leaves upright and firmly. Next, turn down, first one cover, then the other. Follow, by turning down a few leaves at a time, on each side, until the center of the book is reached. Repeat the process once or twice.

The Book Manufacturers' Institute

representing most of the important book manufacturers in the United States, acknowledges with thanks the special cooperation of the following organizations and individuals in making possible this *Book Manufacturing Exhibit*.

THE MACHINES IN OPERATION

Paper-Making, Miniature, Franklin Institute, Philadelphia, Pa.; *Mergenthaler Linotype*, The Composing Room, Inc., New York; *Printing*, Miehle Printing Press & Mfg. Co., Inc., New York; *Folding*, Dexter Folder Company, New York; *Sewing*, The Smyth Mfg. Co., Hartford, Conn.; *Case Making*, The Smyth Mfg. Co., Hartford, Conn.; *Case Stamping*, Brandtjen & Kluge, Inc., St. Paul, Minn.; *Casing-In*, The Smyth Manufacturing Co., Hartford, Conn.; *Standing Press*, E. C. Fuller Company, New York; *Proof Press*, Vandercook & Sons, Inc., Chicago, Ill.

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NATIONAL BOOK FAIR COMMITTEE OF THE BOOK MANUFACTURERS' INSTITUTE—George J. Wilhelm, *Chairman*; John B. Ballou; Alan S. Browne; Donald C. Brock; Joseph

Marcionette; Daniel B. Shepp; C. H. Wilhelm; Bertram Wolff; J. Raymond Tiffany, General Counsel.

THE EXHIBIT was planned and assembled for the Committee by Leon Epstein, H. Wolff Book Manufacturing Co., Inc.

Book Manufacturers' Institute, Inc.

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J. RAYMOND TIFFANY, General Counsel

American Beauty Cover Co.

Becktold Company

Berwick & Smith Co.

Charles H. Bohn & Co., Inc.

Boston Bookbinding Co.

Brock & Rankin, Inc.

A. S. Browne, Inc.

The Burkhardt Company

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